

☐ Fast Access ☐ Joint CINT Proposal

Program Advisory Subcommittee: Nuclear Technology Focus Area:			
Flight Path/Instrument: 1FP05-A / ER1 Estimated Beam Time (days): 5 Days Recommended: 0		Dates Desired: Impossible Dates:	
TITLE Neutron beam characterization measurements and neutron detector calibration at FP-05		<input type="checkbox"/> Continuation of Proposal #: <input type="checkbox"/> Ph.D Thesis for:	
Principal Investigator: Mocko, Michal Institution: Los Alamos National Laboratory Citizenship: Slovak Republic Phone: Email: mmocko@lanl.gov Local Contact: Tovesson, Fredrik FAX:			
Co-Proposers	Institution	Citizenship	E-mail Address
Muhrer, Guenter Tovesson, Fredrik	Los Alamos National Laboratory Los Alamos National Laboratory	Austria Sweden	muhrrer@lanl.gov tovesson@lanl.gov
RESEARCH AREA		FUNDING AGENCY	
<input type="checkbox"/> Biological and Life Science <input type="checkbox"/> Chemistry <input type="checkbox"/> National Security <input type="checkbox"/> Earth Sciences <input type="checkbox"/> Engineering <input type="checkbox"/> Environmental Sciences <input type="checkbox"/> Nuc. Physics/chemistry <input type="checkbox"/> Astrophysics <input type="checkbox"/> Few Body Physics <input type="checkbox"/> Fund. Physics <input type="checkbox"/> Elec. Device Testing <input type="checkbox"/> Dosimetry/Med/Bio <input type="checkbox"/> Earth/Space Sciences <input type="checkbox"/> Materials Properties/Test <input checked="" type="checkbox"/> Other: spallation physics		<input type="checkbox"/> Mat'l Science (incl Cond Matter) <input type="checkbox"/> Medical Applications <input type="checkbox"/> Nuclear Physics <input type="checkbox"/> Polymers <input type="checkbox"/> Physics (Excl Condensed Matter) <input type="checkbox"/> Instrument Development <input type="checkbox"/> Neutron Physics <input type="checkbox"/> Fission <input type="checkbox"/> Reactions <input type="checkbox"/> Spectroscopy <input type="checkbox"/> Nuc. Accel. Reactor Eng. <input type="checkbox"/> Def. Science/Weapons Physics <input type="checkbox"/> Radiography <input type="checkbox"/> Threat Reduction/Homeland Sec. <input type="checkbox"/> Other:	
		<input type="checkbox"/> DOE/BES <input type="checkbox"/> DOE/OBER <input checked="" type="checkbox"/> DOE/NNSA <input type="checkbox"/> DOE/NE <input type="checkbox"/> DOE/SC <input type="checkbox"/> DOE/Other <input type="checkbox"/> DOD <input type="checkbox"/> NSF <input type="checkbox"/> Industry <input type="checkbox"/> NASA <input type="checkbox"/> NIH <input type="checkbox"/> Foreign: <input type="checkbox"/> Other US Gov't: <input type="checkbox"/> Other:	

PUBLICATIONS**Publications:**

Nucl. Instr. Methods A 632 (2011) 101

Abstract: S1525_fp-05.pdf

By electronic submission, the Principal Investigator certifies that this information is correct to the best of their knowledge.

Safety and Feasibility Review*(to be completed by LANSCE Instrument Scientist/Responsible)*

- ☐ No further safety review required ☐ To be reviewed by Experiment Safety Committee
☐ Approved by Experiment Safety Committee, Date:

Recommended # of days:**Change PAC Subcommittee and/or
Focus Area to:****Change Instrument to:****Comments for PAC to consider:****Instrument scientist signature:****Date:**

Neutron-beam characterization measurements and neutron detector calibration at FP-05

Many of the neutron scattering experiments require a rather precise knowledge about the neutron-beam characteristics such as the energy spectrum, neutron intensity, and pulse shape. Our ability to accurately predict these qualities from arbitrary spallation Target-Reflector-Moderator-Shield (TMRS) geometry drives the development of new neutron-scattering instruments and techniques. The neutron-transport codes are essential in the design and/or upgrades of the future spallation neutron sources used for a wide variety of experiments. Hence, it is critical to understand the capabilities and shortcomings of such codes. Further validation of these calculation codes is of utmost importance as our ability to simulate smaller and smaller details is improving. Furthermore, during run cycle 2009 we started a program of systematic measurements of the neutron beam characteristics at selected neutron FPs of the Lujan Center. This year we continue with a measurement of neutron flux and energy spectra that will be compared to the previous year's results. These comparisons will allow us to detect possible changes (failures) of the TMRS components early on.

Experimental results (neutron flux and energy spectra) obtained at this neutron FP will provide an important addition to the characterization database of Lujan TMRS Mark-III. We do not see the need to repeat the measurements of the time emission spectra (neutron pulses or a measure of resolution) since we expect no changes with respect to previous year results. Should the experimental data show discrepancies we will follow up with comprehensive experimental measurements of the neutron time emission spectra.

The proposed experiments will measure the absolute energy spectrum (neutron flux). The energy spectrum will be measured using a low-efficiency BF_3 neutron monitor. The overall absolute normalization may be ensured using a gold-foil activation measurement. On top of the regular characterization measurement we will use this FP to calibrate our BF_3 neutron beam monitor detectors using the LANSCE-NS fission chambers. To accomplish these tasks with acceptable precision and over wide enough energy range we will need 5 days of beam time.